CLAIMS:

1.   Data processing device for performing a reconstruction of CSCT data,
wherein the CSCT data comprises a spectrum acquired by means of an energy resolving
detector element, the data procession device comprising: a memory for storing the
CSCT data; and a data processor for performing a filtered back-projection, wherein the
5   data processor is adapted to perform the following operation: determining a wave-vector
transfer by using the spectrum; determining a reconstruction volume; wherein a
dimension of the reconstruction volume is determined by the wave–vector transfer;
wherein the wave vector transfer represents curved lines in the reconstruction volume;
and performing a filtered back-projection along the curved lines in the reconstruction
10   volume.

2.   The data processing device of claim 1, wherein the spectrum is acquired
during a circular acquisition where a source of radiation is rotated around an object of
interest in a rotation plane.
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3.   The data processing device of claim 2, wherein the reconstruction
volume is furthermore determined by two linear independent vectors of the rotation
plane.

20   4.   The data processing device of claim 1, wherein the energy resolving
detector is arranged such that it measures a scatter radiation scattered by an object of
interest; wherein the CSCT data further comprises information with respect to a primary
radiation attenuated by the object of interest; and wherein a preprocessing is performed
to correct for an attenuation contribution.
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5.   A CSCT apparatus for examination of an object of interest, the CSCT

apparatus comprising: a detector unit with an x-ray source and a scatter radiation
detector; wherein the detector unit is rotatable around a rotational axis extending
through an examination area for receiving the object of interest; wherein the x-ray
source generates a fan-shaped x-ray beam adapted to penetrate the object of interest in

5   the examination area in a slice plane; wherein the scatter radiation detector is arranged
at the detector unit opposite to the x-ray source with an offset with respect to the slice
plane in a direction parallel to the rotational axis; wherein the scatter radiation detector
includes a first detector line with a plurality of first detector elements arranged in a line;
wherein the plurality of first detector elements are energy-resolving detector elements; a

10 data processor for performing a filtered back-projection on first readouts of the scatter
radiation detector, wherein the data processor is adapted to perform the following
operation: determining a wave-vector transfer by using the first readouts; determining a
reconstruction volume; wherein a dimension of the reconstruction volume is determined
by the wave-vector transfer; wherein the wave-vector transfer represents curved lines in

15 the reconstruction volume; and performing a filtered back-projection along the curved
lines in the reconstruction volume.

6.   The CSCT apparatus according to claim 5, wherein the scatter radiation
detector is arranged at the detector unit opposite to the x-ray source parallel to the slice

20 plane and out of the slice plane with such an offset along the rotational axis such that
the scatter radiation detector is arranged for receiving a scatter radiation scattered from
the object of interest, and wherein the CSCT apparatus further comprises: a primary
radiation detector; wherein the primary radiation detector is arranged at the detector unit
opposite to the x-ray source in the slice plane for receiving a primary radiation

25 attenuated by the object of interest; and wherein the data processor performs a
preprocessing to correct for an attenuation contribution by using second readouts of the
primary radiation detector.

7.   The CSCT apparatus according to claim 5, wherein the reconstruction

30 volume is furthermore determined by two linear independent vectors of the rotation
plane and a wave-vector transfer dimension.

8.   Method of performing a reconstruction of CSCT data, wherein the CSCT data comprises a spectrum acquired by means of an energy resolving detector element, the method comprising the steps of: determining a wave-vector transfer by using the

5   spectrum; determining a reconstruction volume; wherein a dimension of the reconstruction volume is determined by the wave-vector transfer; wherein the wave-vector transfer represents curved lines in the reconstruction volume; and performing a filtered back-projection along the curved lines in the reconstruction volume.

10   9.   The method of claim 8, wherein the spectrum is acquired during a circular acquisition where a source of radiation is rotated around an object of interest in a rotation plane.

10.   The method of claim 9, wherein the reconstruction volume is
15   furthermore determined by two linear independent vectors of the rotation plane.

11.   The method of claim 8, wherein the energy resolving detector is arranged such that it measures a scatter radiation scattered by an object of interest; wherein the CSCT data further comprises information with respect to a primary radiation attenuated
20   by the object of interest; and wherein a preprocessing is performed to correct for an attenuation contribution.

12.   The method of claim 8, further comprising the steps of: energizing an x-ray source such that it generates a fan-shaped x-ray beam which penetrates the object of
25   interest in an examination area in a slice plane; performing an integral energy measurement of a scatter radiation by means of a scatter radiation detector with a first detector line with a plurality of first energy-resolving detector elements arranged in a line; reading-out the energy measurement from the scatter radiation detector; rotating the x-ray source and the scatter radiation detector around a rotational axis extending
30   through an examination area containing the object of interest.

13.   Computer program for a data processor for performing a reconstruction of CSCT data, wherein the CSCT data comprises a spectrum acquired by means of an energy resolving detector element, wherein the computer program causes the data processor to perform the following operation: determining a wave-vector transfer by using the spectrum; determining a reconstruction volume; wherein a dimension of the reconstruction volume is determined by the wave-vector transfer; wherein the wave-vector transfer represents curved lines in the reconstruction volume; and performing a filtered back-projection along the curved lines in the reconstruction volume.